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Perceptions of Treatment Side Effects in Women with Breast Cancer and Diabetes: A Qualitative Study

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ABSTRACT

To evaluate patients' perception of treatment side effects associated with breast cancer and concomitant diabetes. Breast cancer survivors who had received chemotherapy or hormonal therapy for stage I-IIIA breast cancer in the preceding five years and had pre-existing type II diabetes were interviewed about their illness beliefs and experiences of treatment side effects. 19 women were interviewed, with a mean age of 63. Five (26%) self-identified as Black, six (32%) as White, and five (26%) as Latina. Four themes were identified: (1) Types of side effects, (2) Impact of side effects, (3) Attribution of side effects, and (4) Communication about side effects. Participants reported more side effects and a greater emotional and physical burden due to breast cancer treatment. Participants also reported insufficient communication from providers regarding treatment side effects for both breast cancer and diabetes, which further impacted patients' illness perception. Participants reported a greater frequency, impact, and range of side effects from breast cancer treatment than from diabetes treatment but experienced confusion about which side effects were attributable to which treatment. Enhanced communication between healthcare providers and patients may mitigate confusion about treatment side effects among breast cancer survivors with comorbidities.

KEYWORDS: cancer survivorship, breast cancer, diabetes mellitus, comorbidity, illness beliefs

With approximately 3.8 million women with breast cancer living in the United States and a reported 34.2 million Americans affected by type 2 diabetes mellitus (DM), DM and breast

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cancer are two leading causes of morbidity and mortality (Centers for Disease Control and Prevention, 2020; Miller et al., 2019; Peairs et al., 2011). Older women with a new diagnosis of breast cancer often have pre-existing health conditions such as DM (DeSantis et al., 2019; Yancik et al., 2001). As long-term survival of early-stage breast cancer improves, an increasing number of breast cancer survivors are living with comorbid chronic conditions. Simultaneous treatment for cancer and DM may have unique implications for patients' perceptions of side effects and decisions about disease management.

Side Effects of Cancer and DM Treatment

There are several side effects associated with treatments for both cancer and DM. Cancer treatments include surgery, radiotherapy, chemotherapy, and hormonal therapy. These treatments may result in persistent pain, lymphedema, premature menopause, sexual dysfunction, hot flashes, and bone pain (Ewertz & Jensen, 2011; Mortimer, 2010). For DM, metformin is a common medication used for glycemic control and is often associated with gastrointestinal side effects (Rojas & Gomes, 2013; Santorelli et al., 2016). Prior studies have found that patients with both breast cancer and DM are at an increased risk of chemotherapy-related toxicities compared to those without DM (Srokowski et al., 2009). A study evaluating 992 women with breast cancer found that 18% had comorbid DM. DM is also associated with worse survival outcomes for those with early-stage breast cancer (Siegelmann-Danieli et al., 2006). Since nearly a fifth of women undergoing breast cancer treatment are concomitantly treated for DM, it is crucial for these patients to recognize the unique side effects of their treatments and understand how their dual diagnoses may affect the course of their diseases (Lega et al., 2018; Petrie & Weinman, 2006).

Cancer and Comorbidities

Despite extensive evidence that comorbidities are common among cancer survivors, research focused on care recommendations to support cancer survivors in managing these comorbidities within the context of cancer remains limited. Moreover, there is limited work examining how comorbidities may impact cancer treatment decision-making. One systematic review on cancer and comorbidities found few studies focused on this intersection of conditions, though multiple studies highlighted the importance of understanding overlapping symptoms, illness identities, and self-management in the context of cancer and chronic comorbidities (Cavers et al., 2019). This knowledge gap may have serious consequences. For example, research has shown that cancer patients with comorbidities have poorer survival, poorer quality of life, and higher healthcare costs (Sarfati et al., 2016). Another research team assessing the impact of age and comorbidity on the management of metastatic colorectal cancer found that chemotherapy, radiation therapy, and major elective resection were less frequently performed in patients with a higher comorbidity burden (Kellokumpu et al., 2021). In contrast, other studies have suggested that comorbidities may lead to cancer overtreatment. For example, patients with multiple comorbidities and low-risk prostate cancer may be overtreated for their prostate cancer as they are not considered ideal surgical candidates (Bradley et al., 2014). Thus, the relationship between cancer treatment and chronic comorbidity management remains unclear and warrants further investigation.

Illness Perception and Self-Management Behaviors

Additionally, in order to appropriately counsel patients, providers need to understand how a patient's perceptions of cancer and comorbid conditions may impact treatment adherence. Previous research has shown that a patient's illness perception influences their emotional response to treatment and can impact treatment adherence (Broadbent, Wilkes, Koschwanez, Weinman, Norton, & Petrie, 2015). After a diagnosis, patients often associate certain symptoms with their condition. Due to improper education and counseling, patients often misattribute some treatment side effects to an illness. However, patients who receive education and counseling regarding their illness and treatment plans may be better equipped to form coping strategies and, in turn, have a more favorable prognosis (Petrie & Weinman, 2006). Despite this information, providers rarely address illness perception with their patients (Petrie & Weinman, 2006).

Illness Perceptions of Cancer Patients with Comorbidity

Previous research has mainly focused on the illness perception of a single illness. These studies have found that illness perception impacts self-management behaviors (SMB) in both patients with breast cancer and those with DM (Li et al., 2022; Perwitasari et al., 2017). However, one study sought to explore the cross-cultural quality of life and illness perception in a sample of Dutch and Japanese breast cancer patients with either asthma or DM. Patients from both cultures attributed major changes to their physical health, emotional functioning, and gastrointestinal side effects to chemotherapy, while there were cultural differences in their perception of their comorbidities (Kaptein et al., 2015). Furthermore, Slightam and colleagues studied patients with multiple chronic conditions and found that medication side effects were one of the most challenging aspects of illness management (Slightam et al., 2018). These studies highlight the need for more research on this topic, as well as the need for healthcare providers to incorporate illness perception in their care for patients with cancer and comorbidities.

Cancer survivors often have other comorbid illnesses, which may require a more complete understanding of patients' illness perception and counseling on treatment (Fu et al., 2015; Lam & Fielding, 2003; van Dam et al., 2005). To date, there has been limited research specifically focused on cancer survivors' perceptions of cancer treatment in tandem with treatment of comorbid DM. One of the few studies on this subject examined Medicare claims data of older adults in the U.S., finding that patients with comorbid cancer and DM had lower rates of low-density lipoprotein and hemoglobin A1C testing, as well as decreased overall DM care engagement after cancer diagnosis compared to matched controls without cancer (Pinheiro et al., 2020). However, the roles of illness perception and/or treatment perception in these self-management gaps have yet to be studied and may be crucial to improving outcomes for patients with chronic illness who develop cancer (Emery et al., 2022). Thus, the present study is well-positioned to contribute to the literature and ultimately inform recommendations for providers on how to best support cancer survivors with DM.

This paper expands on our previous work by incorporating patients' perceptions of comorbid health conditions and their impact on self-management behaviors (Muellers et al., 2022). Specifically, our study sought to explore and characterize perceptions of treatment side effects among breast cancer survivors with comorbid DM. We examined patients' views on the side effects of both cancer and DM treatments, identifying potential patterns in their beliefs, including comparisons between treatment and how patients attributed side effects to either one condition or the other. These findings could offer valuable insights that could inform strategies to address treatment nonadherence and alleviate treatment-related concerns among cancer survivors with coexisting health conditions.

Methods

We conducted semi-structured interviews between September 2017 and March 2018 with early-stage (I-IIIA) breast cancer survivors with pre-existing DM who had completed cancer treatment within the last five years. We developed and pilot-tested an interview guide addressing women's experiences with their DM and breast cancer treatments. A single trained research coordinator administered all interviews. The study was approved by the Institutional Review Board of the Icahn School of Medicine at Mount Sinai (IRB-17-01918).

Sample and Procedures

Recruitment

We identified women treated for breast cancer in a large urban hospital network. Eligible patients were selected from the hospital's breast cancer registry, and inclusion criteria were verified based on review of electronic medical records. Eligible women were at least 55 years of age, community-dwelling, English- or Spanish-speaking, received chemotherapy or hormonal therapy for stage I-IIIA breast cancer within the past five years, had a diagnosis of DM prior to diagnosis of cancer, and were currently prescribed at least one oral DM medication. We excluded women with severe cognitive impairment as well as those unable to come in person for an interview.

A combination of convenience and purposive sampling approaches were used: as patients were identified as eligible based on medical record review, a research coordinator obtained permission to approach each individual via a provider involved in the patient's ongoing care (e.g., oncologist, endocrinologist, primary care physician). All patients whose providers gave permission were approached for participation until saturation was reached. In addition, efforts were made to recruit Spanish-speaking participants to obtain a sample more representative of the patient population. All participants provided informed consent and met with the research coordinator individually in a private setting for the interview. The researchers estimated that 12-20 interviews would be needed to reach thematic saturation (Guest et al., 2006).

Measure Development

The present study was conducted as a qualitative pilot preceding a larger quantitative, longitudinal cohort study of older women with early-stage breast cancer and comorbid DM. As such, the goal of this qualitative descriptive design was to gain insight into patient perspectives on ways in which cancer and DM disease beliefs, SMBs, treatments, and treatment side effects interact (Siedlecki, 2020). The researchers elected to use a theory-driven approach, in which the qualitative data to be collected was guided by existing conceptual frameworks that have previously shown relevance to patients' illness perceptions, SMB, and treatment experiences. The Brief Illness Perception Questionnaire was used as a guiding framework for interview questions about illness beliefs, and participants were asked about beliefs regarding breast cancer and DM corresponding to each of the eight domains of this questionnaire (Broadbent, Petrie, Main, &

Weinman, 2006). Questions regarding SMB and treatment experiences were based on the Common Sense Model (Leventhal et al., 2016)) and asked about adherence to SMBs for DM and breast cancer, current and past treatments, and the perceived impact of beliefs, emotions, and cognitive functioning on SMB.

A semi-structured interview guide was developed and aimed to address specific themes: (1) the impact of breast cancer and DM on everyday life; (2) concern about breast cancer and DM, experiences with treatment for both illness; (3) engagement in self-management behavior (SMB) for both illness (including medication adherence, diet, and exercise); (4) beliefs about the importance of SMB for each illness; and (5) the cognitive effects of chemotherapy and/or hormone therapy. The full interview guide has previously been published (Muellers et al., 2022). The present analyses focused primarily on the domain of treatment-related beliefs, grounded in the expectation that beliefs of treatment effectiveness and the severity of side effects could impact treatment adherence.

Procedure

Individual in-person interviews were conducted by a trained research coordinator. Participants were asked to share their experiences with breast cancer treatment and DM treatment. Interviews lasted an average of 45 minutes, and participants received $20 for their time and effort.

All interviews were audio recorded and transcribed by a professional transcription service. Any identifying information (e.g., names, providers seen, healthcare system name) was redacted from recordings prior to transcription to protect patient privacy. The one interview conducted in Spanish was transcribed, translated, and back-translated by two native Spanish speakers to ensure the accuracy of translation. The interviewer read each transcript line-by-line for accuracy while listening to the corresponding audio recording to produce cleaned, final transcripts for analysis.

Data Analysis

An initial codebook was developed based on the topics in the interview guide, with additional *in vivo* codes added based on the transcripts. Three coders reviewed five initial transcripts individually and met as a team to compare codes. The team then tested the preliminary codebook by independently coding five more transcripts and meeting to resolve discrepancies, iteratively modifying the codebook until a final version was developed. The codebook was determined to be final and thematic saturation to be reached once no new themes emerged from either individual coding or group discussion for five consecutive transcripts, resulting in a total of 19 interviews. A final code key was applied to each transcript, and data was entered into Atlas.ti. Coders then read through each code report to discuss and identify themes that emerged.

Results

Sample Description

Nineteen women completed qualitative interviews: eighteen in English and one in Spanish. Of the 19 participants, five self-identified as Black (26%), six as White (32%), seven as another race (37%), and one declined to provide racial background (Table 1). Five participants identified as Hispanic (26%), 10 identified as non-Hispanic (53%), and four participants declined to provide ethnicity information (21%). The average age was 63 years (standard deviation [SD]: 6.64).

Table 1

Baseline Demographics

Age (mean, SD)	63.00 (6.64)
Race (N, %)	
Black/African American	5 (26)
White/Caucasian	6 (32)
Asian/Pacific Islander	0 (0)
Other	7 (37)
Refused/Unknown	1 (5)
Ethnicity (N, %)	
Hispanic	5 (26)
Non-Hispanic	10 (53)
Refused/Unknown	4 (21)
Pathological Staging (N, %)	
0/Ductal Carcinoma in Situ (DCIS)	2 (11)
IA-IB	7 (37)
IIA-IIB	9 (47)
IIIA	1 (5)
Hormone Receptors (N, %)	
Estrogen Receptors (ER+)	12 (63)
Progesterone Receptors (PR+)	12 (63)
Human Epidermal Growth Factor Receptor-2 (HER-2+)	4 (21)
Triple Negative (ER-/PR-/HER-2-)	2 (11)
Time Since Diagnosis (mean, SD)	2.73 (1.39)
Cancer Treatment Received (N, %)	
Surgery	17 (89)
Radiation	9 (47)
Chemotherapy	9 (47)
Hormone Therapy (HT)	14 (74)
Ongoing HT or Chemotherapy at Enrollment (N, %)	15 (79)
Hemoglobin A1c (mean, SD)	7.34 (1.63)

Two participants (11%) were diagnosed with stage 0 or ductal carcinoma in situ (DCIS), 7 (37%) with stage IA-IB, 9 (47%) with stage IIA-IIB, and 1 (5%) with stage IIIA breast cancer. Of the participants, twelve (63%) had estrogen receptor positive (ER+) cancers, 12 (63%) had progesterone receptor positive (PR+) cancers, 4 (21%) were positive for the Human Epidermal Growth Factor Receptor-2 (HER-2+), and 2 (11%) were triple negative (ER-/PR-/HER-2-). Participants were diagnosed with breast cancer 2.73 years (SD: 1.39) prior to their interviews. Of the participants, seventeen (89%) underwent surgical treatment for breast cancer, 9 (47%) received first-line and/or adjuvant chemotherapy, 9 (47%) received radiation therapy, and 14 (74%) received hormonal therapy. At the time of the study, most of the participants (15, 79%) were still receiving either hormone therapy or chemotherapy. Their average hemoglobin A1c was 7.34 (SD: 1.63).

Themes Identified

We identified four themes related to perceptions of treatment side effects (Table 2). These themes included: (1) Types of Side Effects; (2) Impact of Side Effects; (3) Attribution of Side Effects; and (4) Communication about Side Effects.

Table 2
Themes Related to Perceptions of Treatment Side Effects

Theme	Cancer Treatment	Diabetes Treatment
Type of side effects	• Chemotherapy: joint pain and mental and physical fatigue • Hormonal therapy: nausea, dizziness, hot flashes, joint pain, and chest tightness • Radiation: skin burns, slow healing wounds, and muscle tightness • Surgery: blood clots, infection, weight loss, hematomas, and lymphedema	• Most common: stomach pain and/or digestive issues • Other: dizziness, increased appetite, depression, and nausea
Side effect frequency	• Average of 4.7 distinct side effects reported (range: 1-13) • 17 (89%) reported >1 side effect	• Average of 1.2 side effects reported (range: 0-4) • 8 (42%) reported no side effects
Impact of Side Effects	• Impact on ability to perform activities of daily living such as preparing meals, shopping, and working with hands • Depression • Increased levels of embarrassment • Social isolation	• Changing diet to reduce side effects • Taking medication with food • Changing time of day of medication intake
Attribution of Side Effects	• More likely to attribute side effects to cancer than to diabetes treatment	• Less likely to attribute side effects to diabetes than to cancer treatment
Communication about Side Effects	• Need better communication with and more support from their providers	• Need better communication with and more support from their providers

Types of Side Effects: Cancer Treatment

Cancer treatment side effects ranged widely for both hormonal therapy and chemotherapy, as well as other treatment including radiation and surgery. Most women (89%) reported more than one side effect attributable to cancer treatment. The most reported side effects from chemotherapy were joint pain, which was experienced by nine participants (100% of those undergoing chemotherapy), hair loss, and mental and physical fatigue, each reported by six participants (67%). Other side effects included hair loss (44%), headaches (33%), appetite loss (33%), diarrhea (33%), forgetfulness (22%), sweating (33%), insomnia (22%), and anxiety (11%). Among the 14 participants who received hormonal therapy, the main side effects reported were nausea (29%), dizziness (14%), hot flashes (14%), joint pain (7%), and chest tightness (7%). The nine women who underwent radiation treatment experienced skin burns, slow-healing wounds, and muscle tightness (11% each). After surgery, some women reported blood clots, infections, weight loss, hematomas, and lymphedema (6% each).

Types of Side Effects: DM Treatment

In contrast, eight participants (42%) reported no side effects from DM treatment. In addition, the breadth of side effects attributed to DM treatment was narrower and centered mostly on stomach pain, nausea, and/or diarrhea (26% each) associated with DM medications. Other DM treatment side effects included dizziness (16%), increased appetite (5%), and depressive symptoms (5%).

Impact of Side Effects: Cancer Treatment

Participants discussed how side effects from cancer treatment impacted many components of their lives, ranging from activities of daily living to social and emotional well-being to overall health. One participant stated:

> I developed insomnia. My legs used to hurt really, really bad towards the ending of the chemo. I lost thirty-six pounds. It got to the place with my balance, I couldn't walk by myself... As a result of the chemotherapy, I have neuropathy. I also developed CHF… I couldn't prepare meals or anything. It would really make me tired. (ID:10)

Participants also reported not being able to take public transportation due to treatment side effects, needing someone to help with daily activities such as preparing meals and shopping, and not being able to work with their hands because of joint pain. Some women explained that cancer treatment side effects often affected other aspects of their healthcare. For some, severe side effects from one cancer treatment delayed other cancer treatments. As one participant recalled:

> I had diarrhea for about 40 days. I had to have a blood transfusion. I had very low magnesium and potassium levels so it took a while. I didn't have the surgery. The first week in March was when…we stopped the chemo and I wasn't even able to have the surgery until the middle of April because I was just too weak. (ID:07)

For some women, managing cancer treatments and their side effects interfered with their DM management. For instance, one participant remarked that after completing chemotherapy, "when I did go back to my regular primary doctor, he said, 'What happened? Your sugar is terrible'" (ID:15). Still others developed severe complications such as congestive heart failure and a collapsed lung, resulting in further delays in the treatment of cancer and chronic conditions alike.

Some women discussed how treatment interfered with their social and emotional well-being. One discussed how her chemotherapy affected her memory such that "I could forget a person's name… That's been a friend of mine all my life, and then I see her all of a sudden in the street, and I'm like... 'Oh my God. How are you?' so I could bypass the name part" (ID:15). Women reported feeling depressed, embarrassed, and angry because of side effects. Some participants reported isolating themselves from others: one participant shared that the sweating caused by hormone therapy was so severe that "…when it's really hot I isolate myself and I don't go out…I try and stay as air conditioned as possible" (ID:12).

Multiple participants also noted long-lasting effects of cancer treatment even years after completion of chemotherapy, radiation, and/or surgery. One woman explained, "Today, I still-- I can't travel and take public transportation yet, because I still get the dizzy spells. I'm still working on building my immune system up" (ID:10). Another reported that two years after surgery "I'm…at a standstill. I cannot do exercise…they removed 15 lymph nodes, and I can't carry heavy stuff…it is a very conscious thing that you have to make [do with] all day long" (ID: 14).

Despite the number and severity of side effects, most participants viewed the importance of cancer treatment as outweighing the costs of short- and long-term impacts on their lives: "I'd rather have all the pain in the neck side effects and still be here" (ID:12). Thus, cancer treatment side effects were viewed by many as a necessary burden.

Impact of Side Effects: DM Treatment

When talking about the impact of DM treatment side effects on their lives, women most often alluded to the impact of Metformin on their gastrointestinal systems, associating this medication with discomfort, diarrhea, bloating, and nausea. Some women explained that they changed their diets to reduce medication side effects, such as limiting dairy intake to reduce gastrointestinal side effects. Another woman explained that she altered her medication schedule to coincide with her day-to-day routine to avoid specific gastrointestinal side effects that she would experience from the medication. She said, "I take metformin for 1000 milligrams at night, right before sleep, and if it causes effects, I am at home. But when I go outside and take [Metformin]…I have to run and get to the bathroom" (ID:06). Others reported structuring their days to take medications with food and avoid any side effects. While women were uncomfortable with the gastrointestinal side effects of the DM medications, these symptoms were viewed as less severe than cancer treatment side effects. One woman explained the nausea and gastrointestinal issues associated with Metformin are "…not the most pleasant things, but not the end of the world either" (ID:18).

Attribution of Side Effects

Participants were generally more likely to attribute specific side effects to cancer itself and/or cancer treatment than DM treatments. Notably, all of the participants identified at least one side effect that they attributed to either breast cancer or its related treatments. In contrast, when talking about their DM, women expressed minimal attribution of side effects to their DM medication. When asked if they experienced side effects from DM treatment, eight women said "none" or "not to my knowledge."

While women often attributed specific side effects to cancer treatment, multiple participants expressed uncertainty about whether certain side effects were caused by cancer treatment or other treatments for chronic conditions. When asked about the cause of her sweating, one participant stated, "I take so much stuff that I wouldn't even know. I mean I know that the Arimidex is given me side effects…[but] because I take high blood pressure and cholesterol [medications], so I never know which one is…[causing] side effects" (ID:12).

There was also ambiguity regarding whether certain symptoms resulted from cancer treatment, DM symptoms, or simply aging. For example, one woman stated, "I get dizzy, I start to sweat, and I know that's when my sugar's low… Well, actually also the hormonal pill makes me sweat too" (ID:06). Another participant also stated

> I also have another aspect of the cancer. My toes are numb from the chemotherapy but I also know that's a symptom of diabetes so I don't know if it's going to get worse or-- I mean I know that this was not caused by the diabetes, but I don't know if the diabetes will eventually [make] it worse. (ID:07)

One participant discussed further that her cancer medication caused joint pain and fatigue; however, she was unsure if that was actually due to the medication or to aging in general. She said, "The Taxol…I have fatigue and joint pain, which we're debating whether it comes from this or just getting old, but I belong to a support group on Facebook and it seems everybody also has fatigue and joint pain" (ID:03). Thus, living with multiple health conditions, multiple treatments, and the realities of aging made it difficult for participants to isolate the cause of some symptoms.

Moreover, women more often attributed psychological and cognitive symptoms to cancer-related treatment than DM treatment. For example, one woman stated, "Well, the cancer has affected me a lot, like my memory after the radiation, and it gave me a depression where I can't think straight sometimes. It gives me anxiety also" (ID:14). However, it was difficult to determine whether the new feelings of anxiety and depression were direct side effects of treatment itself or a response to the experience of cancer diagnosis and treatment.

Communication about Side Effects with Providers

Participants often discussed how their expectations for cancer treatment did or did not align with the actual side effects they experienced and the role of their providers in preparing them for these side effects. Some women reported that their oncology providers involved them in decision-making around treatment and allowed them to make choices to mitigate side effects: "he [my oncologist] gave me my options… chemo, or radiation, or surgery. I chose surgery. I'm scared of chemo and radiation. I think it just makes you sick. It may kill the cancer, but the side effects, I'm not doing" (ID:11). Other participants reported that speaking with their physicians regarding side effects helped them better identify their cause and make self-management decisions. One recounted:

> When I was having the diarrhea, he [primary care provider] said it come from diabetes… Being that I'm over the chemotherapy one, I said, maybe it's the diabetes why I'm going to the bathroom so much... And I was saying, maybe it's the cheese…and I was telling my oncologist that I like to eat milk and cereal in the morning…and all of a sudden I started feeling nauseous when I kept eating it. She said, 'You might be lactose intolerant now… Don't do the whole milk, buy soy.' So I bought the soy and I drank the soy and it's better. (ID:15)

In contrast, several women reported feeling frustration towards their providers for not fully explaining treatment side effects for both cancer and DM. These women felt that they should know what to expect when starting these medications and that providers did not take the time to discuss treatment and offer methods to mitigate these side effects. Regarding her experiences with surgery, one participant expressed: "[Doctors] accept too many things as acceptable side effects, and they don't warn people of them…I learned with the chemo and the radiation to ask a lot of questions and look up a lot of things" (ID:18). Another switched to a different provider due to her doctor's insensitivity regarding her long-term treatment side effects:

> I was so upset with this doctor for her way of thinking. It really offended me and insulted me, and I felt like, 'You were my doctor. You knew all of the problems that happened from chemo that I didn't have prior to chemo.' And when I told her that sometimes, I'm exhausted, she said to me that it's no reason why I should be exhausted. Yes, I can't believe how insensitive she was. So, right then and there, I knew that you would no longer be my doctor again. So I switched doctors. (ID:10)

Hence, for many women, the quality of care determined a patient's perception of her illness. The framework through which physicians interacted with and educated their patients on treatment side effects impacted the patients' experience with their illness.

Discussion and Conclusion

Discussion

This qualitative study examined perceptions of treatment side effects among older women who had undergone breast cancer treatment while managing pre-existing DM. Our findings underscore important complexities that these patients face both during cancer treatment and after entering survivorship. Several key themes emerged regarding beliefs about breast cancer and DM treatments and their side effects, which may be used as a guide to better understand how cancer patients perceive their cancer in the setting of comorbid illnesses. Overall, women perceived cancer-related side effects as having greater emotional and physical impacts than side effects from DM treatment. Due to the overlapping side effects of cancer treatment and Metformin, as well as cancer treatments and symptoms of DM and other chronic illnesses, multiple women expressed some confusion about symptom attribution. In addition, patients emphasized the importance of communication with healthcare providers to better understand potential side effects prior to starting treatment. Our findings emphasize the importance of considering the multiple comorbidities and associated treatments that older breast cancer patients are frequently managing during their cancer care and survivorship and the need for enhanced education and communication between patients and their providers regarding these complexities.

Most women in our study reported experiencing a higher frequency and a broader range of side effects from breast cancer treatment. They also reported that cancer treatment side effects had a much greater impact on various aspects of life, including employment, social networks, and activities of daily living, compared to the effects of DM treatment. Because all the participants were diagnosed with DM before breast cancer, some of the side effects due to DM treatment may have subsided by the time these interviews occurred. For example, Metformin, a commonly used medication for DM, has side effects that generally subside over time (Rojas & Gomes, 2013; Santorelli et al., 2016). Breast cancer treatment is also associated with severe side effects and may depend on the treatment the patient is undergoing. It is also important to consider that breast cancer may have a greater emotional and physical significance for participants than a DM diagnosis (Lam & Fielding, 2003).

Our results revealed a tendency to more readily attribute side effects to cancer treatment than DM. Yet, there remained ambiguity about which symptoms were due to which illness treatment. Specifically, women appeared less likely to attribute negative symptoms to their DM treatment, possibly because of the chronicity of this diagnosis. Our patient population expressed confusion regarding symptom attribution, reporting uncertainty about which condition or treatment caused their symptoms.

Addressing this ambiguity requires a focus on improving patient-provider communication, health literacy, and education. For example, previous research has shown that increasing education among providers and their patients can improve medication adherence (Higgins, 2019; Lopez-Campos et al., 2019). An inadequate understanding of the effects of medication not only contributes to decreased adherence but also erodes satisfaction with the prescriber, and improved patient satisfaction has been shown to be associated with increased treatment adherence (Ciechanowski et al., 2001). This issue was further highlighted by women in our study who reported feeling that their providers did not adequately warn them regarding cancer treatment side effects.

In addition, a high working alliance between patient and provider is associated with increased rates of treatment adherence (Lewis et al., 2015). Since prior research suggests that a diagnosis of breast cancer may increase reliance on medical professionals (Lewis et al., 2015), our participants' reports that their providers did not take their symptoms seriously are all the more concerning. This miscommunication may explain why some women were unable to attribute some of their symptoms to their breast cancer or DM treatment and may leave women with breast cancer and comorbid DM without realistic expectations of treatment side effects. As discussed below, future research should explore potential educational, social, and psychological interventions that focus on improved patient-provider communication regarding breast cancer treatment side effects, especially for patients with comorbidities.

Our study expands on existing applications of the BIPQ and Common Sense Model for understanding illness beliefs by considering the role of distinct beliefs about comorbid illnesses and their treatments. Among breast cancer survivors, who often face simultaneously managing their cancer and other chronic illnesses, it is crucial to consider the multiple possible origins of side effects. Equally important is understanding how patients perceive these effects as indicators of their treatments' effectiveness and overall impact. As knowledge and beliefs about treatment are known to impact adherence in both illnesses, our findings highlight the need for further education regarding cancer and comorbid illness treatments to help patients understand the expected side effects of each during concurrent treatment. A recent study evaluated illness perception among 11 women receiving breast cancer treatment in Ghana. A lack of knowledge regarding breast cancer led to negative illness perceptions and influenced patients' ability to adhere to medical treatment (Kugbey et al., \2020). Similarly, in a study evaluating illness perceptions of 260 patients with DM, it was found that increased illness perception is often associated with increased medication adherence. This study suggests the need for educational programs about treatment for both conditions concurrently to improve health literacy and treatment adherence (Bilondi et al., 2021).

The present findings also offer insight into the experiences of patients who are struggling with the treatment of both cancer and DM. Women's perceptions of side effects and symptom ambiguity may be explained by the need for enhanced education and communication between patients and their providers. When working with patients with multiple comorbidities, it is crucial to provide personalized care and focused education when describing medication and its side effects.

Strengths and Limitations

While our participants were diverse in terms of self-reported race and ethnicity, we had a modest sample size, which may have restricted the breadth of experiences and themes that emerged in the interviews. Our sample set was limited to women treated through one urban tertiary care hospital system, limiting generalizability to other populations. Additionally, we limited our sample to older women who had both a diagnosis of breast cancer and comorbid DM since younger breast cancer survivors tend to have few or no comorbidities. Lastly, it is important to recognize that our study is based on self-reported responses and thus has the potential bias of self-reported data.

Practice Implications

In this qualitative investigation, different patterns of perceptions about breast cancer compared to DM treatment side effects emerged. Our findings offer insight into perceptions of treatment side effects for breast cancer survivors with DM, emphasizing the important role that providers have in educating patients about treatment side effects. It is crucial for providers to create a treatment approach for patients that incorporate an understanding of the total impact of an illness on a patient, including social, psychological, and physical aspects. These treatment plans can include assessments of the psychological effects of cancer and its impact on their comorbidities and self-management behaviors (Iwamitsu, 2005). Through this approach, providers can tailor care that will also account for patients' psychological well-being. Most importantly, providers can create targeted education that focuses on comorbidities, which may help improve medication adherence. With appropriate education on their treatment plan, patients can actively participate in their care, thus increasing their likelihood to adhere to treatment (Debono & Cachia, 2007).

While cancer survivors may perceive physicians as only being responsible for the physical impacts of treatment, communication with the broader health team should also be encouraged. This includes both physicians and nurses from other specialties such as primary care, endocrinology, and oncology (Lindley et al., 1999; Mayer et al., 2017). Physicians should inquire about comorbidities at initial oncology appointments to further coordinate patient care. When interviewing a cancer patient, professional interventions and regular review of patients' histories should be instituted to improve patient care. In addition, including patient education in these interventions can improve outcomes (Renders et al., 2001). Specifically, there is a need for educational programs for primary care physicians to review evidence-based and focused care for cancer survivors to optimize their health outcomes and enhance the quality of care received (Chan et al., 2022).

Our study highlights the significant research gap in the care of cancer survivors with comorbid conditions and specifically highlights the need for educational programs for this growing group of patients. Additionally, other areas of research would benefit this population, including psychosocial interventions that can help cancer survivors cope with their diseases and enhance their well-being (Teo et al., 2019). For example, the use of group treatment among women with metastatic breast cancer was successful in providing psychosocial support to this population (Spiegel, 1985). Similarly, among patients with DM, support from peers, providers, and group sessions allowed for better coping skills and lifestyle adaptions (van Dam et al., 2005). Further interventions that offer both problem-focused and emotion-focused intervention tools for patients with both cancer and DM should be explored (Peyrot & Rubin, 2007).

Future studies should also focus on the differences in illness perception of treatment side effects of patients across multiple medical centers and include a broader range of comorbidities. Based on future studies, providers can tailor treatment towards each individual based on their comorbidities and social context. Lastly, developing standardized comorbidity assessments in clinical trials would help further evidence-based guidelines for treating these patients (Williams et al., 2016).

Conclusion

In conclusion, our findings suggest that ambiguity related to the side effects of breast cancer treatment may impact medication adherence for both breast cancer and DM. Enhanced communication between healthcare providers and patients before and during treatment may mitigate confusion about treatment side effects among cancer survivors and increase diabetic medication adherence.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Data and Code Availability

Not applicable

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